



#3

# SEQUENCE LISTING

<110> Bron, Sierd  
Jongbloed, Jan D.H.  
Mueller, Joerg P.  
Van Dijk, Jan M.

<120> Twin-Arginine Translocation in Bacillus

<130> GC634-2

<140> US 09/954,737

<141> 2001-09-17

<150> US 60/233,610

<151> 2000-09-18

<160> 29

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 89

<212> PRT

<213> Escherichia coli

<400> 1

```
Met Gly Gly Ile Ser Ile Trp Gln Leu Leu Ile Ile Ala Val Ile Val
1           5           10           15
Val Leu Leu Phe Gly Thr Lys Lys Leu Gly Ser Ile Gly Ser Asp Leu
20           25           30
Gly Ala Ser Ile Lys Gly Phe Lys Lys Ala Met Ser Asp Asp Glu Pro
35           40           45
Lys Gln Asp Lys Thr Ser Gln Asp Ala Asp Phe Thr Ala Lys Thr Ile
50           55           60
Ala Asp Lys Gln Ala Asp Thr Asn Gln Glu Ala Lys Thr Glu Asp
65           70           75           80
Ala Lys Arg His Asp Lys Glu Gln Val
85
```

<210> 2

<211> 67

<212> PRT

<213> Escherichia coli

<400> 2

```
Met Gly Glu Ile Ser Ile Thr Lys Leu Leu Val Val Ala Ala Leu Val
1           5           10           15
Val Leu Leu Phe Gly Thr Lys Lys Leu Arg Thr Leu Gly Gly Asp Leu
20           25           30
Gly Ala Ala Ile Lys Gly Phe Lys Lys Ala Met Asn Asp Asp Ala
35           40           45
Ala Ala Lys Lys Gly Ala Asp Val Asp Leu Gln Ala Glu Lys Leu Ser
50           55           60
His Lys Glu
65
```

<210> 3

<211> 57  
 <212> PRT  
 <213> Bacillus subtilis

<400> 3  
 Met Pro Ile Gly Pro Gly Ser Leu Ala Val Ile Ala Ile Val Ala Leu  
 1 5 10 15  
 Ile Ile Phe Gly Pro Lys Lys Leu Pro Glu Leu Gly Lys Ala Ala Gly  
 20 25 30  
 Asp Thr Leu Arg Glu Phe Lys Asn Ala Thr Lys Gly Leu Thr Ser Asp  
 35 40 45  
 Glu Glu Glu Lys Lys Lys Glu Asp Gln  
 50 55

<210> 4  
 <211> 70  
 <212> PRT  
 <213> Bacillus subtilis

Q16  
 <400> 4  
 Met Phe Ser Asn Ile Gly Ile Pro Gly Leu Ile Leu Ile Phe Val Ile  
 1 5 10 15  
 Ala Ile Ile Ile Phe Gly Pro Ser Lys Leu Pro Glu Ile Gly Arg Ala  
 20 25 30  
 Ala Lys Arg Thr Leu Leu Glu Phe Lys Ser Ala Thr Lys Ser Leu Val  
 35 40 45  
 Ser Gly Asp Glu Lys Glu Glu Lys Ser Ala Glu Leu Thr Ala Val Lys  
 50 55 60  
 Gln Asp Lys Asn Ala Gly  
 65 70

<210> 5  
 <211> 62  
 <212> PRT  
 <213> Bacillus subtilis

<400> 5  
 Met Glu Leu Ser Phe Thr Lys Ile Leu Val Ile Leu Phe Val Gly Phe  
 1 5 10 15  
 Leu Val Phe Gly Pro Asp Lys Leu Pro Ala Leu Gly Arg Ala Ala Gly  
 20 25 30  
 Lys Ala Leu Ser Glu Phe Lys Gln Ala Thr Ser Gly Leu Thr Gln Asp  
 35 40 45  
 Ile Arg Lys Asn Asp Ser Glu Asn Lys Glu Asp Lys Gln Met  
 50 55 60

<210> 6  
 <211> 171  
 <212> PRT  
 <213> Escherichia coli

<400> 6  
 Met Phe Asp Ile Gly Phe Ser Glu Leu Leu Val Phe Ile Ile Gly  
 1 5 10 15  
 Leu Val Val Leu Gly Pro Gln Arg Leu Pro Val Ala Val Lys Thr Val  
 20 25 30  
 Ala Gly Trp Ile Arg Ala Leu Arg Ser Leu Ala Thr Thr Val Gln Asn  
 35 40 45  
 Glu Leu Thr Gln Glu Leu Lys Leu Gln Glu Phe Gln Asp Ser Leu Lys  
 50 55 60

Lys Val Glu Lys Ala Ser Leu Thr Asn Leu Thr Pro Glu Leu Lys Ala  
 65 70 80  
 Ser Met Asp Glu Leu Arg Gln Ala Ala Glu Ser Met Lys Arg Ser Tyr  
 85 90 95  
 Val Ala Asn Asp Pro Glu Lys Ala Ser Asp Glu Ala His Thr Ile His  
 100 105 110  
 Asn Pro Val Val Lys Asp Asn Glu Ala Ala His Glu Gly Val Thr Pro  
 115 120 125  
 Ala Ala Ala Gln Thr Gln Ala Ser Ser Pro Glu Gln Lys Pro Glu Thr  
 130 135 140  
 Thr Pro Glu Pro Val Val Lys Pro Ala Ala Asp Ala Glu Pro Lys Thr  
 145 150 155 160  
 Ala Ala Pro Ser Pro Ser Ser Ser Asp Lys Pro  
 165 170

<210> 7  
 <211> 258  
 <212> PRT  
 <213> Escherichia coli

<400> 7  
 Met Ser Val Glu Asp Thr Gln Pro Leu Ile Thr His Leu Ile Glu Leu  
 1 5 10 15  
 Arg Lys Arg Leu Leu Asn Cys Ile Ile Ala Val Ile Val Ile Phe Leu  
 20 25 30  
 Cys Leu Val Tyr Phe Ala Asn Asp Ile Tyr His Leu Val Ser Ala Pro  
 35 40 45  
 Leu Ile Lys Gln Leu Pro Gln Gly Ser Thr Met Ile Ala Thr Asp Val  
 50 55 60  
 Ala Ser Pro Phe Phe Thr Pro Ile Lys Leu Thr Phe Met Val Ser Leu  
 65 70 75 80  
 Ile Leu Ser Ala Pro Val Ile Leu Tyr Gln Val Trp Ala Phe Ile Ala  
 85 90 95  
 Pro Ala Leu Tyr Lys His Glu Arg Arg Leu Val Val Pro Leu Leu Val  
 100 105 110  
 Ser Ser Ser Leu Leu Phe Tyr Ile Gly Met Ala Phe Ala Tyr Phe Val  
 115 120 125  
 Val Phe Pro Leu Ala Phe Gly Phe Leu Ala Asn Thr Ala Pro Glu Gly  
 130 135 140  
 Val Gln Val Ser Thr Asp Ile Ala Ser Tyr Leu Ser Phe Val Met Ala  
 145 150 155 160  
 Leu Phe Met Ala Phe Gly Val Ser Phe Glu Val Pro Val Ala Ile Val  
 165 170 175  
 Leu Leu Cys Trp Met Gly Ile Thr Ser Pro Glu Asp Leu Arg Lys Lys  
 180 185 190  
 Arg Pro Tyr Val Leu Val Gly Ala Phe Val Val Gly Met Leu Leu Thr  
 195 200 205  
 Pro Pro Asp Val Phe Ser Gln Thr Leu Leu Ala Ile Pro Met Tyr Cys  
 210 215 220  
 Leu Phe Glu Ile Gly Val Phe Phe Ser Arg Phe Tyr Val Gly Lys Gly  
 225 230 235 240  
 Arg Asn Arg Glu Glu Asn Asp Ala Glu Ala Glu Ser Glu Lys Thr  
 245 250 255  
 Glu Glu

<210> 8  
 <211> 254  
 <212> PRT  
 <213> Bacillus subtilis

<400> 8  
 Met Thr Arg Met Lys Val Asn Gln Met Ser Leu Leu Glu His Ile Ala  
 1 5 10 15  
 Glu Leu Arg Lys Arg Leu Leu Ile Val Ala Leu Ala Phe Val Val Phe  
 20 25 30  
 Phe Ile Ala Gly Phe Phe Leu Ala Lys Pro Ile Ile Val Tyr Leu Gln  
 35 40 45  
 Glu Thr Asp Glu Ala Lys Gln Leu Thr Leu Asn Ala Phe Asn Leu Thr  
 50 55 60  
 Asp Pro Leu Tyr Val Phe Met Gln Phe Ala Phe Ile Ile Gly Ile Val  
 65 70 75 80  
 Leu Thr Ser Pro Val Ile Leu Tyr Gln Leu Trp Ala Phe Val Ser Pro  
 85 90 95  
 Gly Leu Tyr Glu Lys Glu Arg Lys Val Thr Leu Ser Tyr Ile Pro Val  
 100 105 110  
 Ser Ile Leu Leu Phe Leu Ala Gly Leu Ser Phe Ser Tyr Tyr Ile Leu  
 115 120 125  
 Phe Pro Phe Val Val Asp Phe Met Lys Arg Ile Ser Gln Asp Leu Asn  
 130 135 140  
 Val Asn Gln Val Ile Gly Ile Asn Glu Tyr Phe His Phe Leu Leu Gln  
 145 150 155 160  
 Leu Thr Ile Pro Phe Gly Leu Leu Phe Gln Met Pro Val Ile Leu Met  
 165 170 175  
 Phe Leu Thr Arg Leu Gly Ile Val Thr Pro Met Phe Leu Ala Lys Ile  
 180 185 190  
 Arg Lys Tyr Ala Tyr Phe Thr Leu Leu Val Ile Ala Ala Leu Ile Thr  
 195 200 205  
 Pro Pro Glu Leu Leu Ser His Met Met Val Thr Val Pro Leu Leu Ile  
 210 215 220  
 Leu Tyr Glu Ile Ser Ile Leu Ile Ser Lys Ala Ala Tyr Arg Lys Ala  
 225 230 235 240  
 Gln Lys Ser Ser Ala Ala Asp Arg Asp Val Ser Ser Gly Gln  
 245 250

<210> 9  
 <211> 245  
 <212> PRT  
 <213> *Bacillus subtilis*

<400> 9  
 Met Asp Lys Lys Glu Thr His Leu Ile Gly His Leu Glu Glu Leu Arg  
 1 5 10 15  
 Arg Arg Ile Ile Val Thr Leu Ala Ala Phe Phe Leu Phe Leu Thr  
 20 25 30  
 Ala Phe Leu Phe Val Gln Asp Ile Tyr Asp Trp Leu Ile Arg Asp Leu  
 35 40 45  
 Asp Gly Lys Leu Ala Val Leu Gly Pro Ser Glu Ile Leu Trp Val Tyr  
 50 55 60  
 Met Met Leu Ser Gly Ile Cys Ala Ile Ala Ala Ser Ile Pro Val Ala  
 65 70 75 80  
 Ala Tyr Gln Leu Trp Arg Phe Val Ala Pro Ala Leu Thr Lys Thr Glu  
 85 90 95  
 Arg Lys Val Thr Ile Met Tyr Ile Met Tyr Ile Pro Gly Leu Phe Ala  
 100 105 110  
 Leu Phe Leu Ala Gly Ile Ser Phe Gly Tyr Phe Val Leu Phe Pro Ile  
 115 120 125  
 Val Leu Ser Phe Leu Thr His Leu Ser Ser Gly His Phe Glu Thr Met  
 130 135 140  
 Phe Thr Ala Asp Arg Tyr Phe Arg Phe Met Val Asn Leu Ser Leu Pro

Q16

```

400> 10
Met Gly Gly Leu Ser Val Gly Ser Val Val Leu Ile Ala Leu Val Ala
1      5      10      15
Leu Leu Ile Phe Gly Pro Lys Lys Leu Pro Glu Leu Gly Lys Ala Ala
20      25      30
Gly Ser Thr Leu Arg Glu Phe Lys Asn Ala Thr Lys Gly Leu Ala Asp
35      40      45
Asp Asp Asp Asp Thr Lys Ser Thr Asn Val Gln Lys Glu Lys Ala
50      55      60

```

Met	Thr	Met	Met	Thr	Pro	Asn	Gln	Gln	Thr	Ser	Lys	Lys	Lys	Lys	Arg
1				5					10					15	
Lys	Gly	Arg	Lys	Gly	Arg	Val	Pro	Met	Gln	Asp	Met	Ser	Ile	Met	Asp
			20					25					30		
His	Ala	Glu	Glu	Leu	Arg	Arg	Arg	Ile	Phe	Val	Val	Leu	Ala	Phe	Phe
		35					40				45				
Ile	Val	Ala	Leu	Ile	Gly	Gly	Phe	Phe	Leu	Ala	Val	Pro	Val	Ile	Thr
	50					55					60				
Phe	Leu	Gln	Asn	Ser	Pro	Gln	Ala	Ala	Asp	Met	Pro	Phe	Asn	Ala	Phe
	65				70				75					80	
Arg	Leu	Thr	Asp	Pro	Leu	Arg	Val	Tyr	Met	Asn	Phe	Ala	Val	Ile	Thr
			85					90					95		
Ala	Leu	Val	Leu	Ile	Ile	Pro	Val	Ile	Leu	Tyr	Gln	Leu	Trp	Ala	Phe
			100					105					110		
Val	Ser	Pro	Gly	Leu	Lys	Glu	Asn	Glu	Gln	Lys	Ala	Thr	Leu	Ala	Tyr
		115					120					125			
Ile	Pro	Ile	Ala	Phe	Leu	Leu	Phe	Leu	Ala	Gly	Ile	Ala	Phe	Ser	Tyr
	130					135					140				
Phe	Ile	Leu	Leu	Pro	Phe	Val	Ile	Ser	Phe	Met	Gly	Gln	Met	Ala	Asp
	145				150				155					160	
Arg	Leu	Glu	Ile	Asn	Glu	Met	Tyr	Gly	Ile	Asn	Glu	Tyr	Phe	Ser	Phe
			165					170					175		
Leu	Phe	Gln	Leu	Thr	Ile	Pro	Phe	Gly	Leu	Leu	Phe	Gln	Leu	Pro	Val
	180							185					190		
Val	Val	Met	Phe	Leu	Thr	Arg	Leu	Gly	Val	Val	Thr	Pro	Thr	Phe	Leu

	195		200		205										
Arg	Lys	Ile	Arg	Lys	Tyr	Ala	Tyr	Phe	Ala	Leu	Leu	Val	Ile	Ala	Gly
	210				215					220					
Ile	Ile	Thr	Pro	Pro	Glu	Leu	Thr	Ser	His	Leu	Phe	Val	Thr	Val	Pro
225				230				235							240
Met	Leu	Ile	Leu	Tyr	Glu	Ile	Ser	Ile	Thr	Ile	Ser	Ala	Ile	Thr	Tyr
			245					250						255	
Arg	Lys	Tyr	His	Gly	Thr	Thr	Asp	His	Asn	Gly	Gln	Glu	Ser	Ala	Lys
			260					265						270	

<210> 12  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> primer

<400> 12  
 cccaagctta tgaaaggag ggcttttttg aatgg

35

<210> 13  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> primer

<400> 13  
 gcggatccaa agctgagcac gatcgg

26

<210> 14  
 <211> 39  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> primer

<400> 14  
 cccaagctta aaaagaaaga agatcagtaa gttaggatg

39

<210> 15  
 <211> 25  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> primer

<400> 15  
 gcggatccaa gtcctgagaa atccg

25

<210> 16  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> primer  
 <400> 16  
 ggaattcgtg ggacggctac c 21  
 <210> 17  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> primer  
 <400> 17  
 cgggacccat catgggaagc g 21  
 <210> 18  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> primer  
 <400> 18  
 ggggtaccgg aaaacgcttg atcagg 26  
 <210> 19  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> primer  
 <400> 19  
 cgggatcctt tgggcgatag cc 22  
 <210> 20  
 <211> 42  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> primer  
 <400> 20  
 gaggatccat gaggagagag gggatcttga atggcatacg ac 42  
 <210> 21  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> primer  
 <400> 21  
 cgatcctgca ggacctcacc ggattgc 27

<210> 22  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> primer  
  
 <400> 22  
 gtaggatccg cgcctaactt ctcaagc 27  
  
 <210> 23  
 <211> 25  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> primer  
  
 <400> 23  
 atagaattca aaaaggaaga gtatg 25  
  
 <210> 24  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> primer  
  
 <400> 24  
 ctgggggatcc aaaaacagga aggc 24  
  
 <210> 25  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> primer  
  
 <400> 25  
 gagaaggctcg acgcagcatt tacttcaaag gcccc 35  
  
 <210> 26  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> primer  
  
 <400> 26  
 accgggtcga ccgtcgtttt acaacg 26  
  
 <210> 27  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence



<220>  
<223> primer

<400> 27  
gggaattcat ggcctgccc gtt

23

<210> 28  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer

<400> 28  
caaggatccc gaattaagga gtgg

24

<210> 29  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> primer

<400> 29  
ggtctgcagc tgcactaagc ggccgcc

27

9/16  
cnc